SVKM's
D. J. Sanghvi College of Engineering

Program: B.Tech in Electronics Engineering **Academic Year: 2022** **Duration: 3 hours**
Date: 06.01.2023
Time: 10:30 am to 01:30 pm
Subject: Satellite and Optical Fiber Communication (Semester VII) **Marks: 75**

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.

(1) This question paper contains two pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required, but justify it.
(7) Draw the neat labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1 (a)	What is VSAT technology? Give any two applications of VSAT system.	[04]
Q1 (b)	Explain different orbital parameters in satellite communication..	[04]
Q1 (c)	What is the structure of optical fiber? Give the advantage of optical fiber over metallic cables.	[04]
Q1 (d)	A multimode fiber has a core refractive index of 1.480 and a core-cladding index difference 2.0 percent (Δ = 0.020). Find the numerical aperture, the acceptance angle, and the critical angle.	[03]
Q2 (a)	What is the function of the Altitude and orbit control system? Explain the working of Altitude and orbit control system with neat diagram. **OR** What is the Transponder? Explain the double frequency conversion bent pipe transponder for the 14/11 GHz band.	[10] [10]
Q2 (b)	What is earth eclipse of satellite? Explain with neat diagram.	[05]
Q3 (a)	List out different stabilization techniques used in satellite systems. Discuss any one in detail. **OR** Explain with the neat diagrams the indoor and outdoor units of DBS-TV home receiver.	[10] [10]
Q3 (b)	Discuss various space science applications of satellite systems.	[05]

Q4 (a)	With neat diagram explain the working principle and characteristics of LED. **OR** Coherent optical communication is preferred over non-coherent. Why? Explain the working principle and characteristics of PIN photodiode.	[10] [10]
Q4 (b)	Draw a block diagram of fiber optic communication system and describe the function of each component.	[05]
Q5 (a)	Write short notes on any **two.** i. Attenuation and Absorption. ii. Fiber joints and connectors iii. Quantum well LASER iv. Optical link power budget	 [05] [05] [05] [05]
Q5 (b)	A multimode step index optical fiber has a core radius of 25 mm, a core index of 1.48, and an index difference $\Delta = 0.01$. What are the number of modes in the fiber at wavelengths 860, 1310, and 1550 nm?	[05]